

IN THE CLAIMS

1 1. (Original) A serial communications system comprising:
2 a scrambler for converting received data into scrambled data; and
3 an ECC encoder for converting said scrambled data into ECC-encoded data.

1 2. (Original) The system as recited in Claim 1, further comprising:
2 a serializer for converting said ECC-encoded data into serialized data;
3 wherein the ECC-encoded data includes frame alignment information; and
4 the system further comprises a receiver for receiving said serialized data and
5 converting the serialized data into data frames based upon the frame alignment information.

1 3. (Original) The system as recited in Claim 2, wherein the receiver
2 comprises:
3 a frame-recoverer for converting said serialized data into data frames;
4 an ECC decoder for converting said data frames into ECC-decoded data and
5 error indications; and
6 a scrambler for converting said ECC-decoded data into de-scrambled data.

1 4. (Original) The system as recited in Claim 5, wherein said frame-
2 recoverer uses said error indications in converting said serialized data into data
3 frames.

1 5. (Original) The system as recited in Claim 1, wherein said ECC
2 encoder applies an error correction code in converting said scrambled data into
3 said ECC-encoded data.

1 6. (Original) A serial communications method, comprising the steps

2 of:

3 converting received data into scrambled data; and

4 converting said scrambled data into ECC-encoded data.

1 7. (Original) The method as recited in Claim 6, further comprising the

2 steps of:

3 generating a serial stream of the ECC-encoded data; and

4 transmitting said serial stream.

1 8. (Original) The method of Claim 7, wherein:

2 the ECC-encoded data includes frame alignment information; and

3 the method further comprises receiving said serialized data and converting

4 said serialized data into data frames based upon said frame alignment information.

1 9. (Original) The method of Claim 7, further comprising:

2 receiving said serialized data;

3 converting said serialized data into data frames;

4 converting said data frames into ECC-decoded data and error indications; and

5 converting said ECC-decoded data into de-scrambled data.

1 10. (Original) The method of Claim 9, wherein the step of converting

2 the serialized data comprises converting the serialized data into data frames

3 based upon said error indications.

1 11. (Withdrawn) A serial communications system comprising:

2 an ECC decoder for converting data frames into ECC-decoded data; and

3 a de-scrambler for converting said ECC-decoded data into de-scrambled data.

1 12. (Withdrawn) The system of Claim 11, further comprising a frame-
2 recoverer for converting serialized data into said data frames.

1 13. (Withdrawn) The system as recited in Claim 12, wherein:
2 said ECC decoder generates error indications; and
3 said frame-recoverer uses said error indications in converting said serialized
4 data into said data frames.

1 14. (Withdrawn) The system as recited in Claim 13, wherein said
2 frame-recoverer generates a frame clock that is shifted in phase based upon
3 said error indications, said frame-recoverer converting said serialized data into
4 said data frames using said frame clock.

1 15. (Withdrawn) The system as recited in Claim 14, wherein said
2 frame-recoverer shifts in phase said frame clock by a predetermined number
3 of periods of a bit clock based upon said error indications.

1 16. (Withdrawn) The system as recited in Claim 13, wherein said
2 frame-recoverer comprises:
3 a plurality of registers, each register being controlled to receive said serialized
4 data and form two or more frames of parallel data therefrom;
5 a selection control circuit for receiving said error indications and generating at
6 least one control signal; and
7 selection circuitry coupled to receive as inputs the output of said registers and
8 said control signal from said selection control circuit, and output a set of parallel data

9 appearing at the input of said selection circuitry, said number of bits in said set of parallel
10 data corresponding to the number of bits in a frame of data.

1 17. (Withdrawn) The system as recited in claim 16, wherein
2 the selection circuitry comprises a plurality of individual multiplexer circuits,
3 the number of multiplexer circuits corresponding to the number of bits n in a frame of data,
4 each multiplexer circuit being an $n+1:1$ multiplexer circuit.

1 18. (Withdrawn) The system as recited in Claim 13, wherein said
2 error indications are associated with errors in said data frames, said ECC-
3 decoder correcting some of said errors.

1 19. (Withdrawn) A serial communications system comprising:
2 an ECC decoder for converting data frames into ECC-decoded data and error
3 indications; and
4 a frame recoverer for converting serialized data into said data frames using
5 said error indications.

1 20. (Withdrawn) The system as recited in Claim 19, wherein said
2 frame-recoverer generates a frame clock that is shifted in phase based upon
3 said error indications and converts said serialized data into said data frames
4 using said frame clock.

5 21. (Withdrawn) The system as recited in Claim 20, wherein said
6 frame-recoverer shifts in phase said frame clock by a predetermined number
7 of periods of a bit clock based upon said error indications.

1 22. (Withdrawn) The system as recited in Claim 19, wherein said
2 frame-recoverer comprises:

3 a plurality of registers, each register being controlled to receive said serialized
4 data and form two or more frames of parallel data therefrom;

5 a selection control circuit for receiving said error indications and generating at
6 least one control signal; and

7 selection circuitry coupled to receive as inputs the output of said registers and
8 said control signal from said selection control circuit, and output a set of parallel data
9 appearing at the input of said selection circuitry, the number of bits in said parallel set of data
10 corresponding to the number of bits in a frame of data.

1 23. (Withdrawn) The system as recited in claim 22, wherein

2 the selection circuitry comprises a plurality of individual multiplexer circuits,
3 the number of multiplexer circuits corresponding to the number of bits n in a frame of data,
4 each multiplexer circuit being an $n+1:1$ multiplexer circuit.

5 24. (Withdrawn) The system as recited in Claim 19, wherein said
6 error indications are associated with errors in said data frames, said ECC-
7 decoder correcting some of said errors.

1 25. (Withdrawn) The system as recited in claim 19, further
2 comprising:

3 a de-scrambler for converting said ECC-decoded data into de-scrambled data.

1 26. (Original) A serial communications method comprising:

2 converting serialized data into data frames as a function of error indications;
3 and
4 converting said data frames into ECC-decoded data and said error indications.

1 27. (Withdrawn) The method as recited in Claim 26, further
2 comprising:
3 de-scrambling said ECC-decoded data into de-scrambled data.

1 28. (Withdrawn) The method as recited in Claim 26, wherein the step
2 of converting said serialized data comprises:
3 generating a frame clock that is shifted in phase based upon said error
4 indications; and
5 converting said serialized data into said data frames using said frame clock.

1 29. (Withdrawn) The method as recited in claim 26, wherein the step
2 of converting said serialized data comprises:
3 temporarily maintaining bits of said serialized data sufficient to form two or
4 more frames of parallel bits;
5 selecting a frame of data from said maintained bits based upon said error
6 indications, said frame of data being a frame of data in the data frames; and
7 repeating said steps of temporarily maintaining and selecting for generating
8 each data frame from said serialized data.

9 30. (Withdrawn) The method as recited in claim 26, further
10 comprising:
11 initially scrambling received data into scrambled data;
12 converting said scrambled data into ECC-encoded data; and

13 converting said ECC-encoded data into said serialized data.

1 31. (Withdrawn) A serial communications method comprising:

2 converting data frames into ECC-decoded data and error indications; and

3 de-scrambling said ECC-decoded data into de-scrambled data.

1 32. (Withdrawn) The method as recited in Claim 31, further

2 comprising:

3 initially converting serialized data into said data frames as a function of said

4 error indications.

1 33. (Withdrawn) The method as recited in claim 31, further

2 comprising:

3 initially scrambling received data into scrambled data; and

4 performing an ECC encoding operation on said scrambled data to generate

5 said data frames.